財團法人金屬工業研究發展中心
機械測試實驗室
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Metal Industries Research & Development Centre
Mechanical Testing Laboratory
No.25, 37th Road, Industrial Park, Taichung City 40768, Taiwan (R.O.C.)

Testing Laboratory
0099

Date：2024/03/27
Accreditation No.：113TD0327-109-C01

Certificate of Conformance for Freight Container Mechanical Seal Testing
Seal Classification: High Security Seal

Customer：
Unisto AG
Seestrasse 7, CH-9326 Horn, Switzerland
Name of Article: Hi-Genius
Type: Hi-Genius
Serial No.：0000001~0000026
Specification No.：ISO 17712:2013(E)
Test Dates：2024/03/19~2024/03/26

MIRDC, Certifies that 26 samples, 5 for each test and 1 for measurements, of the seal referenced above were subjected to the following tests.

Test Item	Section Number	Classification
Evidence of Tampering (Minimum Diameter)	4.1.3	Pass
Tensile Test	5.2	High security seal (H)
Shear Test	5.3	High security seal (H)
Bending Test	5.4	High security seal (H)
Impact Test room temp	5.5	High security seal (H)
Impact Test reduced temp	5.5	High security seal (H)

Remarks：As per ISO17712:2013(E) Clause 5.1.2 "Testing is to be done once every two years". Therefore, this report expires two years from the test completion date.

Results：The above listed tests were completed with no discrepancies noted. Refer to test report number N0318109-T01 for complete details.

The test results contained herein pertain only to the specimens listed in this report. This report shall not be reproduced, except in full, without the written approval of MIRDC

Approved Signatory： CHIANG, Ching-Liu	Chang Ching Liu
Engineer： SU, Yuan-Da	Su. Yuan-Da

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試驗報告 TEST REPORT

Testing Laboratory
0099

Customer：
Unisto AG
Seestrasse 7, CH-9326 Horn, Switzerland

SUBJECT：Freight containers Mechanical seals classification Testing

Name of Article: Hi-Genius

Type: Hi-Genius

Received Date：2024/03/18

Test Dates：2024/03/19~2024/03/26

Date Issued：2024/03/27

METAL INDUSTRIES RESEARCH & DEVELOPMENT CENTRE 金屬工業研究發展中心 光機電組

CHIANG, Ching-Liu
報告簽署人 (Report Authorized Person)

SU, Yuan-Da
檢驗員 (Inspector)

Note：
(1) The operation and testing of MIRDC laboratory are in conformity to the requirements of ISO/IEC 17025：2017
(Taiwan Accreditation Foundation, Accreditation No.：0099)
(2) This report is responsible for designated samples only.
(3) Reproduction of all or parts this report without a written approval is strictly prohibited.
(4) Decision rules of conformance statement of this test report, do not consider uncertainty of measurement.

1. ABSTRACT

Customer：

Unisto AG
Seestrasse 7, CH-9326 Horn, Switzerland

Name of Article: Hi-Genius

Type: Hi-Genius

Serial No.：0000001~0000026

Quantity Tested：26

Inspection Reference：ISO 17712:2013(E)

Test Item	Section Number	Serial No.	Results
Evidence of Tampering (Minimum Diameter)	4.1.3	0000026	See Page 3
Tensile Test	5.2	0000001~0000005	See Page 4
Shear Test	5.3	0000006~0000010	See Page 6
Bending Test	5.4	0000011~0000015	See Page 7
Impact Test room temp	5.5	0000016~0000020	See Page 8
Impact Test reduced temp	5.5	0000021~0000025	See Page 8

2. Evidence of tampering Test：

Ambient Temp.：18℃；50% R.H.
Inspection Reference：ISO 17712:2013(E)
Result：

Evidence of tampering Section 4.1.3

Specimen No.	Measurement (mm)		Pass/Fail
0000026	Pin Head	18.98	Pass
	Lock Body	18.06	Pass

Requirement：
The minimum diameter (or minimum widest cross-dimension) for the metal components of a bolt seal shall be 18 mm.

Pin Head

Lock Body

3. Tensile Test ：

Testing Instrument：Universal Testing Machine (No.TG0103)
Ambient Temp.：18℃；50% R.H
Inspection Reference：ISO 17712:2013(E)
Result：

Tensile Test Section 5.2

The seal was gripped in a tensile machine and a pull force applied.

Specimen No.	Requirement Load to failure	Result kN	Seal classification
0000001	10.0 kN：High security seal 2.27 kN：Security seal < 2.27 kN：Indicative seal	26.9	High security seal (H)
0000002		25.5	High security seal (H)
0000003		26.1	High security seal (H)
0000004		29.0	High security seal (H)
0000005		31.1	High security seal (H)

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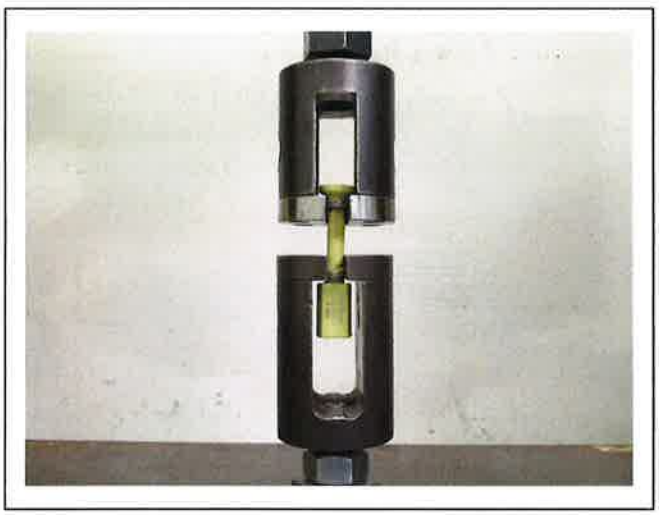
試驗報告 TEST REPORT

Universal Testing Machine

Tensile Set up



4. Shear Test

Testing Instrument：Universal Testing Machine (No.TG0103)
Ambient Temp.：18℃；50% R.H.
Inspection Reference：ISO 17712:2013(E)
Result：

Shear Test Section 5.3

The seal was fixed in a universal testing machine to withstand cutting with shearing blades and a compressive load applied slowly until the seal is severed.

Specimen No.	Requirement Load to failure	Result kN	Seal classification
0000006	3.336 kN：High security seal 2.224 kN：Security seal <2.224 kN：Indicative seal	8.896	High security seal (H)
0000007		8.896	High security seal (H)
0000008		8.896	High security seal (H)
0000009		8.896	High security seal (H)
0000010		8.896	High security seal (H)

Shear Set up

SAFETY PRECAUTIONS - Do not exceed a shear force greater than 8900N(2001lbf). If the specimen has not failed at that force, halt the test and unload the test equipment. Record a shear force of 8896N (2000 lbf). Sudden and violent rupture of the test specimen can endanger personnel, equipment and property.

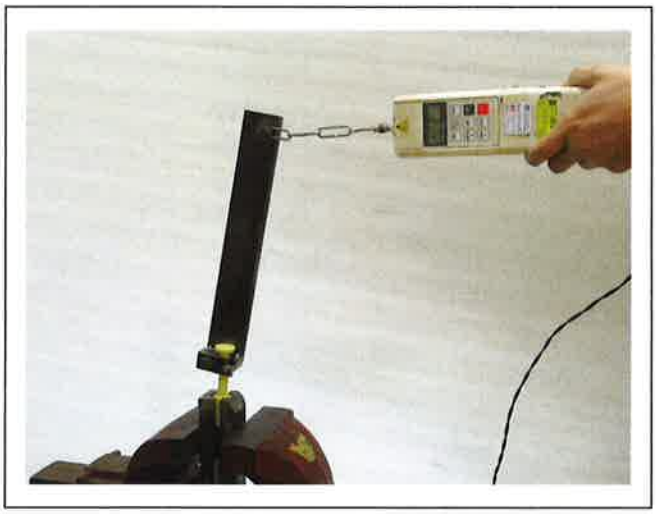
5. Bending Test

Testing Instrument：FORCE GAURE
Ambient Temp.：18℃ ；50% R.H
Inspection Reference：ISO 17712:2013(E)
Result：

Bending Test Section 5.4

Fix the locking end on the universal testing machine in a horizontal position.
Apply a load on the remaining portion of the seal at a distance (the moment arm) above the fixed end so as to bend the seal 90 degrees.

Specimen No.	Requirement Bending moment to failure	Result Nm	Seal classification
0000011	50 Nm：High security seal 22 Nm：Security seal < 22 Nm：Indicative seal	96.0	High security seal (H)
0000012		98.4	High security seal (H)
0000013		98.7	High security seal (H)
0000014		96.3	High security seal (H)
0000015		95.0	High security seal (H)



Bend Set up

6. Impact Test

Testing Instrument：

1. Impact Tester
2. Programmable Low Temp. Tester (No.SG5501)

Inspection Reference：ISO 17712:2013(E)

Impact Test Section 5.5

The impact test is performed at 18 degrees C and minus 27 degrees C of temperature. The impact load is applied at the locking mechanism of the seal in the direction opposite the direction used in locking the seal.

Result：

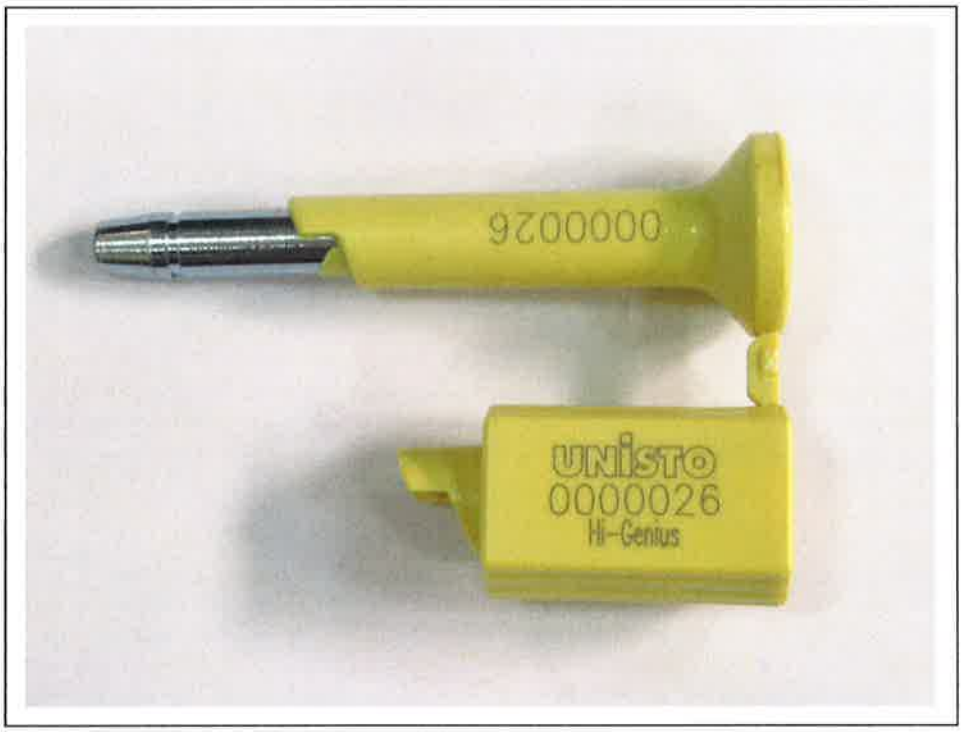
Impact Test at 18±3℃

Specimen No.	Requirement	Result Joule			Seal classification
		13.56	27.12	40.68	
0000016	40.68J：High security seal 27.12J：Security seal <27.12J：Indicative seal **5 impacts at each load**	Pass	Pass	Pass	High security seal (H)
0000017		Pass	Pass	Pass	High security seal (H)
0000018		Pass	Pass	Pass	High security seal (H)
0000019		Pass	Pass	Pass	High security seal (H)
0000020		Pass	Pass	Pass	High security seal (H)

Impact Test at -27±3℃

Specimen No.	Requirement	Result Joule			Seal classification
		13.56	27.12	40.68	
0000021	40.68J：High security seal 27.12J：Security seal <27.12J：Indicative seal **5 impacts at each load**	Pass	Pass	Pass	High security seal (H)
0000022		Pass	Pass	Pass	High security seal (H)
0000023		Pass	Pass	Pass	High security seal (H)
0000024		Pass	Pass	Pass	High security seal (H)
0000025		Pass	Pass	Pass	High security seal (H)

Impact Set up



Name of Article：Hi-Genius
Type：Hi-Genius

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